5-2016

Examination of Age Estimation of the Sternal Rib Ends in the Third and Fourth Left Ribs

Arleigh Jones
University of Tennessee-Knoxville, ajone163@vols.utk.edu

Examination of Age Estimation of the Sternal Rib Ends in the Third and Fourth Left Ribs

Chancellors Honors Thesis

Spring 2016

Arleigh Jones

Abstract

The sternal rib end of right rib IV is frequently used to estimate the age of an unidentified individual. This study's propose is to examine left ribs III and IV with the Işcan et al. (1984, 1985) age estimation methods to determine if there is a significant difference from the standard right rib IV. The research was conducted on white males and females, totaling 98 samples, from the William M. Bass Donated Skeletal Collection at the University of Tennessee, Knoxville. A Wilcoxon signed rank test using SAS Enterprise 6.1 was used to determine if there was a significant difference between the scores using right rib IV, left rib IV, and left rib III. Left rib IV had no significant difference from the correct age phase or the right rib IV; however, left rib III had inconsistent results.

Introduction

Age estimation is a crucial aspect of the biological profile in forensic anthropology. A variety of bones have been studied for the greatest capability to estimate age in unidentified adult remains. One of these bones is the os coxa, which has been analyzed at the pubic symphysis (Todd 1920) and the auricular surface (Lovejoy et al. 1985) in order to estimate age. The closure of cranial sutures has also been used as an indicator of age (Todd and Lyon 1924, 1925), although the accuracy of this method has been questioned (Brooks 1955, Singer 1953). One of the more reliable techniques is estimating age by the sternal end of the right fourth rib. Işcan et

al. (1984, 1985) developed the seminal aging techniques for right rib IV. It can be difficult to accurately identify right rib IV, if right rib IV is even present. In these cases, it is imperative to know if age estimation can be accurately determined for ribs other than right rib IV. On this basis there has been subsequent research on other ribs for aging purposes (Yoder 2001, Alsup 2007). The purpose of this research is to provide new data on the accuracy of applying the Işcan et al. techniques for the right rib IV on the left ribs III and IV.

Literature Review

Işcan et al. (1984, 1985) established the standard age estimation technique for the ribs. They examined the sternal end of the right rib IV and developed a series of nine phases to estimate age range (phase 0 through 8). Rib IV was chosen due to ease of access during medical examinations (Işcan et al. 1984, 1985). They examined trends in the form, shape, texture, and general quality of the sternal ends to determine phases. The medial surface changes from a flat billowy surface to a pit that deepens and widens with increasing age. The rim transforms from a rounded edge to scalloped and then into an irregular edge as age increases. In youth the bone begins solid and dense and overtime progressively thins and becomes porous (Işcan et al. 1984: 1096). Because sex and ancestry can be significantly influential in rib aging, Işcan et al. first published the phase analysis for white males (1984) and then white females (1985). Many anthropologists have since adapted the phases for various populations (Cerezo-Román and Espinoza 2014, Wolff et al. 2012).

Yoder (2001) conducted a comprehensive analysis on right and left ribs II through IX to determine if aging techniques for right rib IV are applicable to other ribs. She examined a total of 249 samples from three different collections: the Smithsonian's National Museum of Natural

History's Terry Collection (n=231); Maxwell Museum's Documented Collection at the University of New Mexico, Albuquerque (n= 5); and the William M. Bass Donated Skeletal Collection at the University of Tennessee, Knoxville (n=13) (2001: 224). Yoder examined black and white samples for females and males ages 10 and older and found that left ribs IV-IX did not vary significantly from right rib IV. However, she did determine that right rib II and left rib III were significantly different from right rib IV. She also found that the left rib III was significantly different from the right rib IV for males, but not for females (Yoder 2001:225).

Alsup (2007) conducted research on aging in the right ribs II, IV, and VIII for her Master's thesis. She chose to analyze these ribs due to the percent differences and significant differences that Yoder (2001) identified in her research (Alsup 2007). Alsup's samples are solely from the Bass Donated Skeletal Collection at the University of Tennessee. She used samples from white males (n=92), white females (n=40), black males (n=18), black females (n=3), and Hispanic males (n=3) for a total sample size of 156 (Alsup 2007: 24-25). She determined that right rib II was significantly overaged using the Işcan et al. methods (Alsup 2007: iv).

Study Objectives

The purpose of this research is to provide new data on the applicability of the Işcan et al. age estimation techniques to the sternal ends of the left ribs. There are two primary questions being addressed. The first null hypothesis is that there is no significant difference between the correct age phase and the estimated age phases for left rib III, left rib IV, and right rib IV. The second null hypothesis is that there is no significant difference in phase estimates between left III and right IV or between left rib IV and right rib IV. Yoder determined that the estimated age phases of right rib IV were significantly different ($p < 0.05$) from left rib III (Yoder 2001: 225).

This study evaluated that conclusion by examining new data for the left rib III and right rib IV. Yoder found no significant difference ($p > 0.05$) between right rib IV and left rib IV (2001: 225). This research also determined whether that finding for right rib IV was consistent in a set of new samples.

This research also evaluated whether the estimates of the left ribs of males and females were significantly different from each other. Yoder found that left rib III was significantly different from right rib IV in the total sample, total male sample, and the black male sample (Yoder 2001: 225). White males, white females, and the total white samples were not found to be significantly different. The current study focused on white males and females. This research examined the significant differences in the total white, white male, and white female samples, testing the applicability of the previous findings to an independent sample.

Materials and Methods

This study examined 98 samples from the William M. Bass Donated Skeletal Collection at the University of Tennessee, Knoxville. Of these, 47 were female, and 51 were male. The male and female samples were age estimated using the Işcan et al. (1984, 1985) methods for white males and females, respectively. The sample demographics are displayed in Table 1. In order to increase statistical power and limit possible confounding variables, this study focused solely on white individuals. No samples from autopsies were examined. The samples from the Bass Collection have been aged based on documentation. Samples selected for the research consist of individuals documented as ages 20 through 79. Due to time restrictions and the presence of taphonomic damage to many of the rib ends, the sample size was smaller than preferred.

Table 1 – Distribution by age phase for females and males

Phase Category	Female	Male
Phase 4	0	0
Phase 5	3	3
Phase 6	12	9
Phase 7	21	10
Phase 8	11	29
Total	47	51

The age estimation methods were analyzed for right rib IV, left rib III, and left rib IV. To account for intraobserver error, each sample was age estimated twice, i.e., round 1 and round 2. In order to produce independent results for comparison with Alsup (2007) and Yoder (2001), their samples were excluded by only examining remains collected from 2007 to the present.

The data were statistically analyzed using the SAS enterprise 6.1 program. When the ages reported for each phase in the Işcan et al. (1984, 1985) methods overlapped, the higher phase was selected. A Wilcoxon signed rank test was performed to determine if there was significant intraobserver error. The test of intraobserver error found no significant difference ($p < 0.05$) in male round 1 and round 2. As such, round 1was used as representative for the remaining analysis. There was a significant difference ($p < 0.05$) in the test of intraobserver error between female round 1 and round 2. As shown in Table 2, the ribs in round 1were more consistent with the correct age phase than round 2; therefore, round 1 was selected for the subsequent analyses. A Wilcoxon signed rank test was used to determine if there was a significant difference from the correct age phase for right rib IV, left rib III, and left rib IV. The difference between left rib III and left rib IV, respectively, were analyzed against right rib IV.

Table 2 – Wilcoxon signed rank test for the accuracy of phase estimation for female round 1 and female round 2

	Significance Test	
Ribs	**Round 1**	**Round 2**
Left rib III	0.963	0.0521
Left rib IV	0.0885	**0.0015***
Right rib IV	**0.0204***	**0.0003***

*** Significance at p < 0.05**

Results

As previously stated, there was no significant difference in intraobserver error for the males, but there was significant difference found in the female and total samples. The intraobserver error results are included in Table 3.

Table 3 - Wilcoxon signed rank intraobserver error results

	Significance Test		
Rib Set	**Males**	**Females**	**Total**
Left Rib III	0.8249	**0.0029***	**0.0236***
Left Rib IV	0.2308	**0.0096***	**0.0057***
Right Rib IV	0.6796	**0.0472***	0.3240

*** Significance at p < 0.05**

Accuracy was determined by comparing the estimated age phase to the correct age phase. The accuracy results are displayed in Table 4. Left rib III in the males and right rib IV in the females and the total were significantly different from the correct age phase. There was no significant difference in the accuracy for left rib IV.

Table 4 - Wilcoxon signed rank test of accuracy of phase estimation

	Significance Test		
Ribs	**Males**	**Females**	**Total**
Left Rib III	**0.0176***	0.9630	0.0598
Left Rib IV	0.5434	0.0885	0.1186
Right Rib IV	0.2644	**0.0204***	**0.0197***

*** Significance at p < 0.05**

Tables 5 through 10 depict the differences between the correct age phase and the estimated age phase for left rib III, left rib IV, and right rib IV for females and males. These tables show that while many estimates were within one phase difference from the correct age phase, there was some variability between the correct and estimated age phases, sometimes as extreme as a difference of four phases.

Table 5 - Difference between correct and estimated age phase for male round 1, rib L-III

	Correct Age Phase				
Difference	**5**	**6**	**7**	**8**	**Total**
3	1				1
2		3			3
1	2	2	2		6
0		2	2	13	17
-1		2	2	10	14
-2			3	1	4
-3			1	3	4
-4				2	2

Table 6 - Difference between correct and estimated age phase for male round 1, rib L-IV

	Correct Age Phase				
Difference	**5**	**6**	**7**	**8**	**Total**
2	2	4			6
1	1	2	5		8
0			2	16	18
-1		3	3	7	13
-2				4	4
-3				2	2

Table 7 - Difference between correct and estimated age phase for male round 1, rib R- IV

	Correct Age Phase				
Difference	**5**	**6**	**7**	**8**	**Total**
2	2	3			5
1	1	2	4		7
0		4	2	15	21
-1			3	8	11
-2			1	2	3
-3				3	3
-4				1	1

Table 8 - Difference between correct and estimated age phase for female round 1, rib L-III

	Correct Age Phase				
Difference	**5**	**6**	**7**	**8**	**Total**
2	3	1			4
1		6	4		10
0		4	10	5	19
-1			4	6	10
-2		1	2		3
-3			1		1

Table 9 - Difference between correct and estimated age phase for female round 1, rib L- IV

	Correct Age Phase				
Difference	**5**	**6**	**7**	**8**	**Total**
2	1	2			3
1	1	2	2		5
0	1	6	12	2	21
-1		2	3	7	12
-2			4	2	6

Table 10 -Difference between correct and estimated age phase for female round 1, rib R-IV

	Correct Age Phase				
Difference	**5**	**6**	**7**	**8**	**Total**
2		2			2
1	3	3	1		7
0		5	9	2	16
-1		2	7	7	16
-2			3	2	5
-3			1		1

Left rib IV was compared to right rib IV with no significant difference in estimated phase for males, females, or the total, as seen in Table 11. Statistical analysis of the estimated phase for left rib III indicated no significant difference from right rib IV in the total sample. However, when the samples were examined for each sex, both males and females demonstrated significant difference in left rib III against right rib IV.

Table 11 - Wilcoxon signed rank test of right rib IV versus left ribs

	Significance Test		
Ribs	**Males**	**Females**	**Total**
L-III vs R-IV	**0.0188***	**0.0061***	0.6683
L-IV vs R-IV	0.2885	0.4073	0.1008

*** Significance at p < 0.05**

These results indicate that there was consistently no significant difference for left rib IV regarding either the correct age phase or comparison to right rib IV phase estimate. Left rib III phase estimates demonstrated inconsistent results in accuracy and comparison to right rib IV.

Discussion

The significant difference in the intraobserver error for the females is likely attributed to the researcher who lacked prior experience with aging techniques in the ribs. Training rounds

were originally practiced on males. These estimation techniques for the males did not translate well to the female methods. Additionally less time was allocated for learning phase estimation techniques for females than males. A larger sample size would have likely reduced this error; however, due to sample conditions and time constraints this was not practical.

The null hypothesis that left rib III, left rib IV, and right rib IV had no significant difference from the correct age phase was only partially supported. In the female and total samples, right rib IV was significantly different from the correct age phase. Right rib IV was the control and as such these results were unexpected. This is most likely a result of researcher error, and is another possible explanation for the intraobserver error present among females. The impact this had on the remaining results is speculative.

However, the null hypothesis that left rib IV was not significantly different from the correct age phase failed to be rejected for the female, male, and total samples. Similarly, right rib IV for males, as well as left rib III for females and the total, was not significantly different from the correct age phase. The null hypothesis that left rib III for males was not significantly different from the correct age phase was rejected. Left rib III for males was significantly different.

The results from this research confirm Yoder's observations (2001) that there is no significant difference in age estimation between left rib IV and right rib IV. Based on these results, left rib IV could be used as a substitute for right rib IV. The presence of significant differences in left rib III indicates that this rib is not a reliable alternative for the right rib IV aging methods used.

Left rib III was significantly different from right rib IV for females and males. Although the total sample indicates there is no significant difference, the results for left rib III have been inconsistent, and therefore, unreliable.

Yoder suggests that increased stress from handedness and other motions of the arm could be a factor in the significant difference observed in the left rib III (Yoder 2001: 226-227). Alsup suggests a similar phenomenon for the significant difference in right rib II (Alsup 2007: 32). Yoder also found that while there was significant difference in right ribs II and III, there was only significant difference in left rib III. Future research into aging methods with the Işcan et al. (1984, 1985) technique should examine if handedness could be correlated to this discrepancy or if it affects aging with right rib IV.

Yoder observed in her research that there was significant difference between left rib III and right rib IV in the total sample, black male sample, and total male sample; however, there was no significant difference in the white male, white female, or total white samples (2001: 225). This study found different results than Yoder. Although the total sample was not significantly different, similar to Yoder's total white sample, both the white males and white females were significantly different. This could be a result of variability between samples and collections. This inconsistency further demonstrates the incompatibility of left rib III in the Işcan et al. method.

Conclusion

In estimating age with the Işcan et al. method (1984, 1985), a variety of studies evaluated the possibility of substituting different ribs for the right rib IV (Yoder 2001, Alsup 2007). This research examined the applicability of these techniques with left rib III and left rib IV. Left rib IV demonstrated no significant difference from right rib IV in male, female, and total samples,

while left rib III was significantly different from right rib IV for both females and males. This study indicates that left rib III is not reliable as a substitute for right rib IV. Whenever possible, right rib IV ought to be used for age estimation. However, left rib IV could be a dependable alternative.

Future research could attempt to determine a phase analysis method specific for left rib III or other ribs that do not age consistently with right rib IV. In this case it may prove necessary to evaluate if handedness affects ribs II and III differently on the right and left sides.

References

Alsup, Barbara Kathleen

2007 Investigation of Second, Fourth, and Eighth Sternal Rib End Variation Related to Age Estimation. M.A. Thesis, Department of Anthropology, University of Tennessee.

Brooks, S.T.

1955 Skeletal age at death: the reliability of cranial and pubic age indicators, American Journal of Physical Anthropology. 13: 567–597.

Cerezo-Román, Jessica Inés and Patricia Olga Hernández Espinoza

2014 Estimating age at death using the sternal end of the fourth ribs from Mexican males. Forensic Science International 236: 196.e1–196.e6.

Işcan, M.Y., Loth S.R., and Wright R.K.

1984 Age estimation from the rib by phase analysis: White males. Journal of Forensic Sciences 29:1094–1104.

1985 Age estimation from the rib by phase analysis: White females. Journal of Forensic Sciences 30: 853-863.

Lovejoy ,C.O., Meindl R.S., Mensforth R., and Barton T.J.

1985 Chronological metamorphosis of the auricular surface of the ilium: a new method for the determination of adult skeletal age at death. American Journal of Physical Anthropology 68: 15-28.

Singer, R.

1953 Estimation of age from cranial suture closure. A report on its unreliability, Journal of Forensic Medicine. 1: 52–59.

Todd, T.W.

1920. Age changes in the pubic bone: I, the white male pubis. American Journal of Physical Anthropology 3: 285-334.

Todd, T.W. and D.W. Lyon

1924 Cranial suture closure. Its progress and age relationship. Part I. Adult males of White stock, American Journal of Physical Anthropology. 7: 325–384.

1925 Cranial suture closure. Its progress and age relationship. Part II. Ectocranial closure in adult males of White stock, American Journal of Physical Anthropology. 8: 23–45.

Wolff, K., Z. Vas, P. Sótonyi, and L.G. Magyar

2012 Skeletal age estimation in Hungarian population of known age and sex. Forensic Science International 223: 374.e1–374.e8.

Yoder, C., Ubelaker D.H., and Powell J.F.

2001 Examination of variation in sternal rib end morphology relevant to age assessment. Journal of Forensic Sciences 46(2): 223-227.

Raw Data - Round 1

ID	Sex	Age Phase L - III	Age Phase L - IV	Age Phase R - IV	Actual Age	Correct Age Phase
01-08D	M	8	8	8	77	8
01-12D	M	8	8	8	74	8
02-10D	M	8	8	8	76	8
03-10D	M	4	6	7	65	8
05-11D	M	7	7	8	71	8
05-12D	M	6	6	6	64	7
07-10D	M	8	8	8	78	8
09-08D	M	5	5	5	70	8
100-08D	M	8	7	7	39	5
100-11D	M	8	8	8	66	8
104-09D	M	7	7	7	69	8
105-09D	M	8	8	8	71	8
107-07D	M	5	5	6	46	6
108-10D	M	8	8	8	64	7
108-11D	M	8	8	8	68	8
11-10D	M	8	8	8	72	8
111-10D	M	8	7	7	49	6
112-10D	M	8	8	8	48	6
113-09D	M	8	8	8	52	6
119-09D	M	8	8	8	62	7
12-11D	M	7	8	8	58	7
18-09D	M	4	5	4	65	8
18-10D	M	7	7	7	67	8
23-10D	M	7	8	8	72	8
25-09D	M	7	6	7	78	8
26-09D	M	8	8	8	74	8
28-11D	M	5	7	7	56	7
28-12D	M	6	8	8	61	7
29-08D	M	7	8	7	64	7
30-11D	M	5	6	5	71	8
31-11D	M	6	7	6	43	6
31-12D	M	8	8	7	76	8
32-12D	M	7	8	8	53	6
38-09D	M	6	5	6	50	6
38-13D	M	6	7	6	70	8
43-11D	M	7	8	8	70	8
44-12D	M	7	8	6	68	8
45-12D	M	7	8	7	67	8
46-12D	M	6	7	7	38	5
61-09D	M	5	6	6	57	7
65-09D	M	8	8	8	76	8
69-11D	M	4	6	5	64	7
75-10D	M	5	5	6	46	6
76-10D	M	8	8	8	71	8
77-10D	M	6	6	6	33	5
80-11D	M	5	6	5	71	8
82-09D	M	7	8	7	44	6
88-08D	M	7	7	8	66	8
93-09D	M	5	7	6	64	7
95-11D	M	8	7	7	67	8
97-11D	M	7	7	7	65	8
02-08D	F	5	7	7	64	7
03-07D	F	7	7	6	61	7
08-07D	F	7	7	6	57	6

Raw Data - Round 1

ID	Sex	Age Phase L - III	Age Phase L - IV	Age Phase R - IV	Actual Age	Correct Age Phase
09-12D	F	7	7	7	63	7
108-07D	F	6	6	7	69	7
111-07D	F	7	6	7	50	6
115-07D	F	6	6	7	51	6
13-08D	F	8	7	8	75	8
13-11D	F	7	7	6	60	7
13-13D	F	5	6	6	68	7
17-12D	F	6	6	6	57	6
17-13D	F	7	7	6	40	5
20-08D	F	8	7	7	62	7
24-12D	F	7	7	7	71	8
25-07D	F	8	7	7	77	8
25-13D	F	6	5	5	59	7
26-10D	F	7	7	7	66	7
27-11D	F	4	5	4	61	7
29-13D	F	7	7	7	76	8
35-13D	F	7	6	6	79	8
37-11D	F	4	5	5	57	6
38-11D	F	7	7	6	59	7
40-10D	F	8	7	7	61	7
41-12D	F	8	7	8	67	7
42-11D	F	7	8	7	62	7
42-14D	F	7	7	7	67	7
46-11D	F	8	6	6	76	8
49-10D	F	7	7	7	72	8
52-07D	F	8	7	6	67	7
52-10D	F	7	7	7	79	8
55-07D	F	8	8	8	51	6
57-11D	F	6	8	6	63	7
59-07D	F	8	8	8	71	8
62-11D	F	7	5	5	46	6
63-10D	F	8	7	7	72	8
63-11D	F	7	6	5	67	7
65-11D	F	7	8	8	58	6
68-07D	F	7	6	6	42	5
70-10D	F	7	5	6	38	5
72-08D	F	6	7	6	55	6
82-11D	F	6	5	5	60	7
84-08D	F	7	6	6	46	6
85-08D	F	6	6	6	47	6
86-09D	F	7	8	7	73	8
87-08D	F	7	5	6	67	7
87-09D	F	7	6	7	47	6
98-07D	F	7	7	7	66	7

Raw Data - Round 2

ID	Sex	Age Phase L - III	Age Phase L - IV	Age Phase R - IV	Actual Age	Correct Age Phase
01-08D	M	7	7	7	77	8
01-12D	M	8	8	8	74	8
02-10D	M	8	8	8	76	8
03-10D	M	5	6	7	65	8
05-11D	M	8	8	8	71	8
05-12D	M	7	8	8	64	7
07-10D	M	8	8	8	78	8
09-08D	M	5	5	5	70	8
100-08D	M	7	7	7	39	5
100-11D	M	8	8	8	66	8
104-09D	M	6	6	6	69	8
105-09D	M	8	8	8	71	8
107-07D	M	3	4	5	46	6
108-10D	M	8	8	8	64	7
108-11D	M	7	7	8	68	8
11-10D	M	8	8	8	72	8
111-10D	M	8	8	8	49	6
112-10D	M	8	8	8	48	6
113-09D	M	8	7	7	52	6
119-09D	M	8	8	8	62	7
12-11D	M	8	8	8	58	7
18-09D	M	4	5	5	65	8
18-10D	M	7	6	8	67	8
23-10D	M	8	8	8	72	8
25-09D	M	8	7	8	78	8
26-09D	M	8	8	8	74	8
28-11D	M	5	7	7	56	7
28-12D	M	6	8	8	61	7
29-08D	M	7	7	6	64	7
30-11D	M	5	6	6	71	8
31-11D	M	6	4	6	43	6
31-12D	M	7	8	8	76	8
32-12D	M	7	8	8	53	6
38-09D	M	4	5	5	50	6
38-13D	M	6	7	7	70	8
43-11D	M	8	8	7	70	8
44-12D	M	7	8	6	68	8
45-12D	M	6	7	7	67	8
46-12D	M	6	7	7	38	5
61-09D	M	6	5	6	57	7
65-09D	M	7	8	8	76	8
69-11D	M	4	5	4	64	7
75-10D	M	6	6	6	46	6
76-10D	M	8	8	8	71	8
77-10D	M	7	7	7	33	5
80-11D	M	6	7	6	71	8
82-09D	M	7	7	7	44	6
88-08D	M	7	7	7	66	8
93-09D	M	6	7	7	64	7
95-11D	M	8	7	7	67	8
97-11D	M	5	5	7	65	8
02-08D	F	5	5	5	64	7
03-07D	F	7	7	7	61	7
08-07D	F	8	7	7	57	6
09-12D	F	7	7	7	63	7
108-07D	F	6	6	6	69	7
111-07D	F	6	6	7	50	6
115-07D	F	6	6	6	51	6

Raw Data - Round 2

ID	Sex	Age Phase L - III	Age Phase L - IV	Age Phase R - IV	Actual Age	Correct Age Phase
13-08D	F	7	7	7	75	8
13-11D	F	8	7	6	60	7
13-13D	F	6	5	6	68	7
17-12D	F	5	7	7	57	6
17-13D	F	6	6	6	40	5
20-08D	F	7	6	6	62	7
24-12D	F	5	5	6	71	8
25-07D	F	8	7	7	77	8
25-13D	F	6	6	5	59	7
26-10D	F	6	6	7	66	7
27-11D	F	4	5	5	61	7
29-13D	F	7	7	7	76	8
35-13D	F	8	7	7	79	8
37-11D	F	5	5	5	57	6
38-11D	F	6	5	5	59	7
40-10D	F	8	7	7	61	7
41-12D	F	8	8	8	67	7
42-11D	F	6	8	6	62	7
42-14D	F	8	8	7	67	7
46-11D	F	5	5	6	76	8
49-10D	F	7	7	7	72	8
52-07D	F	6	6	6	67	7
52-10D	F	6	6	6	79	8
55-07D	F	8	8	8	51	6
57-11D	F	6	7	6	63	7
59-07D	F	7	7	7	71	8
62-11D	F	7	6	6	46	6
63-10D	F	7	6	6	72	8
63-11D	F	7	6	6	67	7
65-11D	F	7	7	7	58	6
68-07D	F	7	6	6	42	5
70-10D	F	6	5	5	38	5
72-08D	F	6	6	6	55	6
82-11D	F	4	4	5	60	7
84-08D	F	6	6	5	46	6
85-08D	F	6	6	6	47	6
86-09D	F	6	8	7	73	8
87-08D	F	6	5	5	67	7
87-09D	F	7	6	6	47	6
98-07D	F	7	6	7	66	7